

9. Safety

1. Abstract

In accordance with the Act on Prevention of Radiation Hazards due to Radioisotopes, etc., the 49th and 50th applications for the approval of changes in SPring-8 and SACLA facilities were approved on October 5, 2021 and March 16, 2022, respectively. The environmental radiation inside the facilities and the surrounding area of the SPring-8/SACLA site was monitored, and it was confirmed that the radiation levels were well below the legally mandated limits. Additionally, the management of the 5,256 registered radiation workers was properly conducted. This included the implementation of radiation training and the management of their personal radiation exposure. Similarly, chemicals, high-pressure gases, biological experiments, cranes, and lasers were managed in compliance with all applicable laws and regulations.

2. Radiation safety management

2-1. Summary

There were no problems regarding radiation management in accelerators or facilities on the site in FY2021.

2-2. Applications for approval

The following applications for changes in the radiation facilities were submitted in FY2021:

49th application for approval of amendment

Application date: March 5, 2021

Approval date: October 5, 2021

(1) Change of operating time of linear accelerator and booster synchrotron

(2) Changes in SR (storage ring) beamline BL31LEP

(3) Removal and addition of sealed radioisotopes

50th application for approval of amendment

Application date: October 12, 2021

Approval date: March 16, 2022

(1) Change in the operation of the radiation-controlled area in the linear accelerator building

(2) Changes in SR beamlines BL07LSU, BL09XU, and BL17SU

(3) Change of shielding wall due to installation of the front end on SR beamline

(4) Removal and addition of sealed radioisotopes

2-3. Radiation Protection Committee

The Radiation Protection Committee met three times in FY2021:

34th Harima Radiation Protection Committee (July 29, 2021)

The content of the 50th application for the approval of changes was deliberated and approved.

35th Harima Radiation Protection Committee (September 30, 2021)

The content of the 50th application for the approval of changes was redeliberated and approved.

36th Harima Radiation Protection Committee (March 18, 2022)

The content of the annual report was confirmed.

2-4. Periodic inspections/facility inspections

The periodic inspections and facility inspections

conducted in FY2021 were as follows.

The facility of the SR Beamline BL20B2 was inspected on April 22, 2021 and pronounced satisfactory on April 23.

No mandated periodic inspections/confirmations were conducted in FY2021.

2-5. Radiation monitoring

Radiation measurements of all accelerator facilities (including the SR beamlines) of SPring-8/SACLA confirmed that the radiation levels were below the standards mandated by law. In controlled areas of SPring-8/SACLA where workers regularly enter, a maximum dose of 1.5 $\mu\text{Sv/h}$ was detected in a beamline hutch of the Experimental Hall of the SR. However, in places where SPring-8/SACLA users work, the measured radiation doses were less than 1.0 $\mu\text{Sv/h}$ (background level). Radiation doses at other measuring points were also much less than the legal limit of 1 mSv/week (duration of evaluation: 40 h/week). Similarly, periodic inspections confirmed that the radiation doses at the boundaries of the controlled areas during SPring-8/SACLA operations were well below the legal limit of 1.3 mSv/3 months (duration of evaluation: 520 h/3 months).

Measurements of the environmental radiation conducted at the boundaries of the site detected a maximum dose rate of 0.08 $\mu\text{Sv/h}$ and a maximum accumulated dose of 0.02 mSv/3 months, which was much lower than the legal limit of 0.25 mSv/3 months (duration of evaluation: 2,184 h/3 months). Quarterly measurements of the surrounding environment confirmed that SPring-8/SACLA operations did not affect the radiation levels in the environment surrounding the site.

2-6. Management of radiation workers and access control of facilities

In FY2021, there were 5,256 radiation workers. This included 3,805 SPring-8/SACLA users, which accounted for about 72% of all radiation workers. There were a total of 5,505 temporary visitors.

2-7. Management of personal radiation exposure

Personal dosimeters were issued to personnel who worked on the site as radiation workers. Each month the used dosimeters were collected to measure the exposure doses. Personal dosimeters were also issued to short-stay visitors such as public beamline users for the duration of their stay as well as to resident workers of external organizations for every month that they were stationed. These dosimeters were collected after use to measure the exposure doses.

Measurements of radiation doses conducted in SPring-8/SACLA verified that the exposure doses of all radiation workers were much lower than the limits mandated by related laws and regulations and the Regulations for Radiation Hazard Prevention. These observations demonstrated that there is no radiation problem.

3. Safety management of chemicals

Chemicals were controlled in a manner compliant with related laws and regulations. Biannual working environment measurements on specified chemical substances and organic solvents confirmed that they were handled appropriately in the working environments. Voluntary periodic inspections and necessary repair work on local exhaust devices to handle chemicals were conducted to ensure adequate performance. Narcotics, stimulants, and psychotropics approved for use were controlled in a

proper manner. The required application and notification concerning these items were implemented in compliance with all related laws and regulations.

4. Safety management of high-pressure gases

The control of high-pressure gases and necessary applications/notifications were conducted in accordance with related laws and regulations.

5. Safety management of biological experiments

5-1. Genetic recombinant experiments

In FY2021, 63 projects (including 29 user projects) were conducted after being examined and approved by the Genetic Recombination Committee or the Bio-safety supervisor.

5-2. Animal experiments

In FY2021, ten projects (including nine user projects) approved by the Animal Experiment Committee were conducted. An on-site inspection of the facilities for breeding and housing experimental animals conducted by the Hyogo-prefecture Animal Protection Center on October 11, 2021 did not identify any deficiencies.

5-3. Microorganisms

In FY2021, six projects approved by the committee were conducted.

5-4. Research involving human subjects

In FY2021, 13 projects (including nine user projects) involving human-derived materials were conducted after approval by the committee and the like.

6. Safety review of proposals

A total of about 2,700 proposals underwent a safety review. The safety issues in 2021A-term and B-term proposals were reviewed in Jan 2021 and June 2021, respectively. In addition, General Proposals, Time-Designated Proposals, Urgent Proposals, Measurement Service Proposals, In-house Proposals, and others were also reviewed.

7. Emergency measures

Although SPring-8/SACLA could not accept any users from overseas owing to the suspension of newly arrived foreign visitors by the Japanese government from January 2020, for domestic users, thorough measures were taken to prevent new coronavirus infections, such as disinfection during guest house cleaning.

As for the Harima Campus Safety Inspection, the scale of the inspection was reduced, as in FY2020, from the viewpoint of infection prevention, and as for the joint emergency drill, a simulation drill was conducted assuming a fire at a beamline in the SPring-8 Storage Ring with the attendance of the Kouto Branch of the Tatsuno Fire Department.

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